ADDITIONS TO THE LIST OF TABLE CAPE FOSSILS, TOGETHER WITH FURTHER REMARKS UPON CERTAIN FOSSIL SHELLS SUPPOSED TO BE IDENTICAL WITH LIVING SPECIES.

By Robt. M. Johnston, F.L.S., Etc.

[*Read June* 9, 1884.]

On the last occasion on which we met I intimated to this Society that Professor Tate was energetically engaged upon the important work of thoroughly determining and settling some of the more difficult points of classification with regard to the fossil species of the Australian Marine Tertiaries which were supposed to be identical with living forms.

On that occasion, also, I pointed out that the fossil shell, formerly referred to the living *Pectunculus laticostatus*, was a very distinct species not identical with any known living form, and accordingly I proposed for it the name of *P. McCoyi*. Since that time I have received three important communications from Prof. Tate prepared for this Society. In one of them I am gratified to find that this distinguished naturalist concurs with my determination in respect of *P. McCoyi*. He also, among other suggestions, desired me to re-examine and compare carefully the fossil forms hereafter referred to with the living types supposed to be identical with them, as he had doubts regarding the correctness of their determination. Through the kindness of Captain Beddome, who placed his valuable collection of the living types at my disposal, I was enabled to carry out his wishes, and as there was not sufficient time since then to allow of the results of my examination to be communicated to Prof. Tate, and afterwards included in his communication to this Society, I have thought it best to prepare a separate note upon the matters referred to me.

The fossil forms more particularly referred to me for re-examination and comparison with living types are the following :—

1. *Crossea labiata*—Ten.-Woods. Fossil form, originally determined by the writer.
2. *Natica polita*—Ten.-Woods. Fossil form, originally determined by Rev. J. E. Tenison-Woods.
3. *Trivia Europea.*—Fossil form, originally determined by Rev. J. E. Tenison-Woods.
4. *Trigonia acuticostata*—McCoy. Fossil form, originally determined by Prof. McCoy.
5. *Syrnola bifasciata.* Fossil form, originally determined by Rev. J. E. Tenison-Woods.

Crossea labiata (*Tenison-Woods*).

The fossil shells, originally referred to the living species described by Rev. J. E. Tenison-Woods, were again submitted by me to a most careful comparison with a fine collection of living forms. As the result of this examination, I still find that, although the fossil representatives are decidedly larger than the living ones, there are no characteristic differences between them, so far as the tests are concerned, if we except the fact that in the living form the varix bordering the aperture is generally sharper and more decidedly reflexed. This character is constant in all the individuals—nine or ten—examined by me. In the fossil representatives the striae upon the varix are almost obsolete, and, consequently, the latter has not that appearance which Mr. Woods describes as "fringe-like." It must be confessed, therefore, that it would be difficult to separate the living from the fossil so far as absolute differences are concerned. Still, so far as the trifling differences go, I must admit that they are sufficiently constant to enable a careful classifier to recognise the living from among the fossil representatives with a considerable degree of confidence, and, perhaps, for these reasons, it might be well to recognise the constant differences, slight though they may be, as of specific value. I hesitate myself to decide in such a case, until I learn how far the Table Cape fossil form agrees with the fossil forms discovered in the same horizon in the South Australian and Victorian formations, which have now been so fully investigated by Professor Tate.

Natica polita (*Tenison-Woods*).

Curiously enough, of the two representatives—the fossil and living—hitherto known as *N. polita*, the fossil was the first known to science. The living form was discovered almost immediately after the fossil form was described, and was determined by Mr. Woods to be conspecific with the latter. On comparing a large series of living and fossil forms together, however, I find the following differences to be constantly maintained. In the living form the spire is more depressed, and the whorls increase more rapidly in size. In the fossil form the nucleus is invariably smaller than in the living representative, and the number of whorls in mature specimens is $4\frac{1}{2}$. In the living mature form the number of whorls is invariably $3\frac{1}{2}$. The aperture in both does not present any marked difference, if we except the fact that, in the fossil state, the inner margin is almost vertical. In the living form, the same feature is more decidedly angled relative to a central line drawn through the nucleus. If anything the

fossil shell is larger and more solid, although it must be stated that, if an immature fossil shell be selected for comparison with only the same number of whorls developed as in the mature living form, the latter seems to be the broader of the two. As these differences are constant I am convinced that the living form, although identical with the fossil form in other important respects, is quite a distinct species, and I propose, with the concurrence of Professor Tate, that it should be named *N. Beddomei*, in honour of my friend Captain Beddome, who, by his dredging operations, has so largely added to our knowledge of the marine fauna of Tasmania.

Trivia Europea.

The small or dwarfed fossil specimens collected by me at Table Cape were originally referred to—*T. Europea*, by Mr. Woods. In his "Notes on the Fossils" of Table Cape, p. 91, Proc. Roy. Soc. of Tas, 1876, he states: "*Trivia Europea* and *Eulimella subulata* are European forms, which, I believe, occur at Table Cape as fossils." I am satisfied now, however, from examination of a larger number of specimens, that all the specimens of the former so determined by Mr. Woods are dwarfed or young representatives of *Trivia avellanoides*, McCoy. This fossil also occurs in the turritella limestone of Flinders' Island. Fragments of this rock are abundant on the beaches on Barren, Badger, Clarke, and Swan Islands in Bass' Straits. The fragments are usually drifted ashore attached to seaweed, and in one collected by me on Swan Island I disclosed the cast of a small perfectly characterised *T. avellanoides*, associated with fragments of fossils too imperfect for specific identification belonging to the following genera, viz., *Cylichna*, *Voluta*, *Pectunculus*, *Lima*, *Tellina*.

Trigonia acuticostata (*McCoy*).

Although this species was included in my "Comparative Table showing Distribution of Australian Marine Tertiary Shells," etc., pp. 90a., 90f., Proc. Roy. Soc., Tas., 1876, I did not refer it to the Table Cape beds as supposed by Professor Tate. Up to the present time I have neither seen nor heard of this species being discovered in Tasmanian tertiary deposits. I may also mention that I cannot altogether concur with Professor McCoy when he states that the acute nodose squamæ are characters which separate *T. acuticostata* from all living species. As regards the living *T. Margaretacea*, it may be confidently affirmed that fresh or unworn shells do not show blunt lamellose squamæ until the individuals are well

advanced in size, and even then the blunted costate lamellæ are all closely crowded at the extreme margin of valves.

SYRNOLA BIFASCIATA.

I have in vain searched for a fossil representative of this shell in my type collection, nor can I trace any in the collection belonging to this Society. I am therefore of opinion that a very distinct fossil species, named by me *Odostomia*, has been mistaken for *S. bifasciata*. *Odostomia microlirata*, mihi, somehow was omitted to be published by me. I now give the description :—

Odostomia microlirata (*n.s.*)—Shell minute, white, shining, elongately conoid, turriculate; spire acute; nucleus exerted, twisted sinistrally; whorls $8\frac{1}{2}$, flattened, surface finely obsoletely striated concentrically, crossed by very fine wavy microscopic liræ; suture distinct; aperture sub-auriform; outer lip thin; columella uniplicate. Length, 8mil.; great. dia., 2mil.

This fossil shell somewhat resembles the living *Syrnola bifasciata*, but it is easily distinguished from it by the twisted nucleus, its greater size, and the fine obsolete liræ. Two or three specimens discovered by me in the Table Cape beds.

From the excellent figures and descriptions contained in Professor Tate's monograph "On the Australian Tertiary Palliobranchs," Trans. Phil. Soc., Adelaide, 1880, I have also been enabled to identify a number of previously undetermined specimens of Brachiopods in my collection originally derived from the Table Cape beds. The following is a complete list of the Brachiopods now known to me as occurring at Table Cape, viz. :—

Terebratula vitreoides—Woods
Waldheimia Garibaldiana—Davidson
„ *furcata*—Tate
„ *grandis*—Woods
„ *Johnstoniana*—Tate
„ *Tateana*—Woods
„ *Corioensis*—McCoy
„ *pectoralis (?)*—Tate
Terebratulina Scoulari (?)—Tate
„ *lenticularis*—Tate
„ *triangularis (?)*—Tate
Terebratella Tepperi—Tate
„ *Woodsii*—Tate
Rhynchonella squamosa—Hutton.

Those marked (?) are determined from imperfect specimens and require verification.

The result of these re-determinations, taken together with those referred to in Professor Tate's communication, leave only two out of nearly 300 known species in the Table Cape

beds, which, as yet, are free from doubt as regards their identification with living species. The two exceptions are *Limopsis Belcheri* (Adams and Reeve) and *L. aurita* (Brocchi). But these two, certainly, do not represent one per cent. of the species determined to be extinct, and, consequently, if we are not prepared to reject the *per-centage* method in the determination of the great divisions of the tertiary period, we must assuredly refer the Table Cape beds not to the *miocene* but to the *eocene*, or "early dawn," of the tertiary period in Australia. It is now five years ago (pp. 86-87, Proc. Roy. Soc. of Tas.) since I made use of the following statement before the members of this Society:—"This continual lessening of the per-centage of living to extinct forms as our knowledge increases is most significant. According to the principle which has been adopted by Mr. Lyell, and through him by nearly all English geologists, this low per-centage of living representatives indicate rather more an *eocene* than a *miocene* age for our marine beds at Table Cape." The investigations carried on by Professor Tate and other indefatigable workers, since that time, have placed this matter beyond all reasonable doubt, and now there is every reason to believe that the Table Cape beds, with their Australian equivalents, mark the earliest dawn of the eocene period in Australia. In conclusion, I may venture to prophecy, notwithstanding the gap between the cretaceous rocks of Maryborough, Queensland, and the eocene beds of Table Cape, that the day is not far distant when passage beds will be discovered connecting these systems more closely together, if not completely merging the one insensibly into the other.

DISCOVERY OF ENTOMOSTRACA IN THE UPPER MEMBERS OF THE TRAVERTIN BEDS, GEILSTON, AND A DESCRIPTION OF A NEW SPECIES OF CYPRIS.

By Robt. M. Johnston, F.L.S., Etc.

[*Read June* 9, 1884.]

Cypris Alburyana (*n. s.*).

Carapace oblong-oval, somewhat flattened on one side; valves convex, smooth, shining, white; breadth contained in length two-and-a-half times; length usually $\frac{3}{4}$mil. Gregarious in the altered opalescent rock overlying the basalt in the Travertin Limestone Quarry at Geilston.